rence of their physiognomic features in many continental areas, adds to the difficulties of plant geographers. He shows that no order, no sub-order, not even a tribe, is endemic in the smaller oceanic islands, and that the very distinct genera that occur are not disproportionate. To the question, Do the flowers of endemic insular plants present any peculiarities of size, shape, or colour? we get an instructive answer in the tabulated analysis of the endemic plants of St. Helena. From it we learn that "the size of the flowers and flower-heads in this flora is on the whole rather above than below the average of those of their allies in other parts of the world. When we come to colour, however, the equality fails altogether, red being almost entirely wanting in the insular plants, and blue unknown." The absence of butterflies and the abundance of moths on the island is a significant concomitant circumstance, as Mr. Hemsley remarks. Particulars are not yet forthcoming from other islands to permit of like analysis, and Mr. Hemsley merely concludes that brilliantly-coloured flowers are rare in such islands.

Amongst the special features of insular floras discussed and illustrated by Mr. Hemsley in the introductory portion of the volume, is the preponderance of shrubby and arboreous Compositæ, and of woody plants generally. That islands "often possess trees and bushes belonging to orders which elsewhere include only herbaceous species" as Darwin stated, he shows, by tabulated evidence of the occurrence of arboreous or shrubby forms allied to insular ones upon continental areas, requires modification. To illustrate the difficult problem of the absence or rarity of large, almost ubiquitous, orders in oceanic islands, he selects Leguminosæ, Orchideæ (the table showing the absence of species or the number of species of Orchideæ in various islands is extremely interesting), and Gymnospermæ; and the concomitant rarity of insects is suggested as a probable explanation so far as the first two orders are concerned. We cannot further notice these and other fascinating subjects dealt with by Mr. Hemsley in the introduction, but must recommend botanists and all interested in the subject of plant-distribution to peruse the volume, where, in addition to the information imparted by Mr. Hemsley himself, they will find a serviceable bibliography of insular floras and an index of islands with the names of authors who have written about them.

In the introductory notes to the several floras in the second, third, and fourth parts of the book Mr. Hemsley manages to convey a vast deal of information. Accounts of the physical features, the history of the island, as well as analyses of the vegetation are given, and he finds room for illustrative extracts from the works of travellers who have visited the islands. Many interesting subjects crop up in these—for example, the question of the sandal-wood in Juan Fernandez; but space forbids our noticing them. It needs, however, little examination of this portion of the book to convince one of the genuine character of the work which has been put into the preparation of the floras. The synonymy, the distribution, the critical notes, and the general information regarding each species, all testify to a conscientious search after completeness and accuracy, the result being a thoroughly trustworthy record of what is at present known regarding them. One point we may criticise unfavourably. We notice Mr. Hemsley has adopted the system of writing all specific names with a commencing small letter. This, though a prevailing custom with zoologists, is an innovation in botanical description in this country, and without discussing methods of nomenclature, which would be beside our purpose here, we would simply say that we do not agree with Mr. Hemsley in admiring it.

We have only been able to touch upon a few points in this excellent volume, sufficient, we hope, to indicate its importance. Problems of plant-distribution meet us frequently throughout the volume, and Mr. Hemsley's work is a most important contribution towards their solution. Of especial value is his treatment of the subject of the sea and birds as factors in distribution. A somewhat disjointed character in the book and frequent repetition are defects which are perhaps inseparable from the method of its preparation. For inequalities the author apologises, and the merit of the book as a whole fully atones for them. Mr. Hemsley's deservedly high reputation as a systematic botanist, confirmed by his "Botany of Central America," now approaching completion, is still further enhanced by this his most recent work.

We may add that the volume is illustrated by many excellent plates, chiefly drawn by Miss Smith.

Besides bearing witness to the good fortune which placed the making of botanical collections during the voyage of the *Challenger* in the hands of so able a naturalist as Mr. Moseley, the volume testifies in a very emphatic manner to the inestimable value of our national herbaria, especially that at Kew. Collections of plants, small and incomplete in themselves, are there accumulated ready for use when occasion requires, forming the material from which such volumes as this we notice may be constructed. We cordially join Mr. Hemsley in his hope that his work may direct attention to the nature and extent of the observations required from travellers for the advancement of our knowledge of the subject of plant-distribution, and we may conclude with one other aspiration. There is at present no authoritative book in our language on the subject of botanical geography, and too many of the phytogeographical works published nowadays are purely statistical compilations. Is it, then, too much to expect from the pioneer in the philosophical treatment of plant-distribution, Sir Joseph Hooker, whose name is in so special a manner associated with the subject of insular floras, a comprehensive work on botanical geography such as he alone could write? We hope not.

HALSTED'S "ELEMENTS OF GEOMETRY"

The Elements of Geometry. By G. Bruce Halsted. (New York: John Wiley and Sons, 1885.)

MR. HALSTED is already favourably known to English mathematicians by an excellent "Elementary Treatise on Mensuration" (published in the summer of 1881), and by one or two carefully compiled bibliographies in the *American Journal of Mathematics*. The faithful chronicler records of Tom Tulliver that he called his Manual of Geometry "the exasperating Euclid," a title richly deserved if his desire to be excused the "doing" of it were really based upon the reason he assigned, viz. "It brings on the toothache, I think." Now we have not an annotated copy of the "Mill

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on the Floss," and so cannot identify the particular edition which produced such a wretched result, but we doubt not it was one of the ordinary small text-books with which youth were well acquainted, in shape at least, at the time referred to. And this makes us allude to the portentous dimensions of the book before us, which consists of some 370 large octavo pages. The book is not for schoolboys, but is intended for students of larger growth. It commences, as does also "The Elements of Plane Geometry" (brought out by the Association for the Improvement of Geometrical Teaching), with a preliminary chapter on Logic, which gives sufficient introduction to a subject in which "the mind first finds logic a practical instrument of great power."

We turn aside for a moment to state a *raison d'être* for the volume before us. "In America the geometries most in vogue at present are vitiated by the immediate assumption and misuse of that subtile term 'direction'; and teachers who know something of the non-Euclidian, or even the modern synthetic geometries, are seeing the evils of this superficial 'directional' method. Moreover, the attempt, in these books, to take away by definition from the familiar word 'distance' its abstract character and connection with length-units, only confuses the ordinary student. A reference to the article *Measurement*, in the 'Encyclop. Britannica' will show that around the word 'distance' centers the most abstruse advance in pure science and philosophy. An elementary geometry has no need of the words 'direction' and 'distance.' The present work, composed with special reference to use in teaching, yet strives to present the elements of geometry in a way so absolutely logical and compact that they may be ready as rock-foundation for more advanced study."

This lengthy extract puts our readers in possession of Mr. Halsted's views: the result of his efforts is an edition which will, we think, repay perusal.

Now, in reply to old Tulliver's query, "Wat's Euclid?" it was replied, "It's definitions, and axioms, and triangles, and things. It's a book I have got to learn in—there's no sense in it." (Such is the view of some boys of the present day, as we discovered in looking over answers to a recent examination paper.)

Mr. Halsted defines a straight line thus:—It is a line which pierces space evenly, so that a piece of space from along one side of it will fit any side of any other portion. In his definition of an angle (*AOB*) one of the angles is said to be the *explement* of the other; he uses the term "straight angle," calls a terminated line (as in his "Mensuration") a *sect*, and "the whole angle which a sect must turn through, about one of its end points, to take it all around into its first position, or, in one plane, the whole amount of angle round a point, is called a *perigon*." Other definitions do not call for notice, except that in the definition of a circle he has, by an oversight, omitted to state that the sect must revolve in a plane.

The First Book is divided into eight chapters, and embraces the matter of Euclid's First Book, with several other important propositions: the order is not that of Simson's text, but propositions are grouped under problems, inequalities, parallels, triangles, and polygons. This last head is broken up into the divisions, general properties (congruence), parallelograms, equivalence, and axial and central symmetry.

In Book II. the commutative law (for addition and multiplication), the associative law, and the distributive law are established, and the propositions proved symbolically. Books III., IV., V., and VI. correspond to Euclid's divisions, but the selection of propositions and their arrangement and treatment agree with results we have seen nearer home.

But we hasten to a close, remarking that the remaining books treat of planes and lines (VII.); tri-dimensional spherics (VIII.); two-dimensional spherics (IX.); polyhedrons (X.); mensuration or metrical geometry (XI.) in five chapters, length, area, ratio of a circle to its diameter, measurement of surfaces, space-angles, and the measurement of volumes. The work closes with short paragraphs on direction, principle of duality, linkage, and cross-ratio.

There are some 234 exercises grouped together at the end, and also interspersed throughout the text.

There are a few typographical errors and a few slips in statement, and very many novel terms, *i.e.* to persons who have not read the "Mensuration" referred to above. We understand that the book is about to be published in this country, when geometers will be easily able to procure a copy for an examination, which will not be unattended, we believe, with profit.

The figures are in the main carefully drawn, though some few require correction.

OUR BOOK SHELF

The Zoological Record for 1884. Edited by Prof. F. Jeffrey Bell, M.A. (London: John Van Voorst, 1885.)

WE have to congratulate the *Zoological Record* Association on having brought out this the twenty-first volume of the *Record* within the year. The publication of the *Zoological Record*, begun in 1865, was continued from 1871 by this Association, which well deserves every encouragement that the biologist can give to it. It would be a deep disgrace to our British School of Natural History if so valuable a work should be allowed to come to an end after having well and bravely struggled for existence for one-and-twenty years. At present the Association numbers only fifty-three members and seventy-one subscribers, in addition to which several of our public libraries no doubt take their copies from the publishers; but to make the Association a self-supporting one, it should have a couple of hundred new subscribers, and such a number ought to be had from among the numerous students of zoology in this country. A vigorous effort now made might mark this year in the history of the *Zoological Record* as one of financial success.

While writing thus of the present, our thoughts also wander to the past. Although none of the original writers for the *Record* have gone to their long account, yet with the present volume, the last of them, Prof. E. von Martens, ceases from his *Record* labours, and his place is to be taken by four very excellent recruits,—Prof. Herdman, Messrs. W. E. Hoyle, G. R. Vines, and G. H. Fowler. The only one of the Recorders who kept in the race for the whole of the twenty one years—Prof. von Martens—had all through the great group of the Mollusca to record, and then, on the dropping out of the ranks of other Recorders, he took the Molluscoida and Crustacea. It is not possible to part with such a contributor without publicly recording the great debt that all interested in zoology owe to him for his labours.

One other contributor, also of long standing, now parts company from his comrades. On Mr. Kirby had fallen the parts of Dallas and Rye. No less than Prof. von Martens he deserves our thanks. His part we are

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